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RSPAC

ANNUAL REPORT

COLLABORATING FOR THE FUTURE

1997

REMOTE SENSING PUBLIC ACCESS CENTER
A COOPERATIVE PROJECT AMONG NASA'S IITA PROGRAM, BDM INTERNATIONAL, AND WVU

TECHNICAL REPORT - PERFORMANCE

PUBLIC USE OF EARTH AND SPACE SCIENCE DATA OVER THE INTERNET - REMOTE SENSING PUBLIC ACCESS CENTER (RSPAC)

AUGUST 1996 - JULY 1997

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TABLE OF CONTENTS

Observatorium
.nasa.gov
Exploring NASA's Big Backyard

1.0 INTRODUCTION

— — This document chronicles the achievements of NASA's Remote Sensing Public Access Center (RSPAC) for the reporting period of August 1996 through July 1997. BDM International, which operates RSPAC, is contractually required to produce this report in support of the Technical Report - Performance requirement as listed in Supplement No. 13, Section D, Milestone #17 of NASA's cooperative agreement NCC5-100.

2.0 RSPAC BACKGROUND

— — The Remote Sensing Public Access Center (RSPAC) is a component of NASA's Information Infrastructure Technology and Applications (IITA) project. The IITA project is funded through NASA's Federal High Performance Computing and Communications (HPCC) program.

One of more than forty (40) projects funded by IITA, RSPAC serves as a focal point for all of the NASA IITA project teams and supports their activities. The two major areas of RSPAC activity are IITA support (providing technical and programmatic support to IITA projects) and IITA outreach (the dissemination of information to the public about NASA, IITA projects, and Earth and space science via the Internet, CD-ROMs, and conferences).

RSPAC was established on August 9, 1994, through a cooperative agreement between NASA, BDM International, and West Virginia University (WVU). BDM International is a Fortune 1000 multinational information technology company that provides systems, solutions, and services to public sector and commercial customers in the United States and abroad. West Virginia University is a public land-grant university located in Morgantown, WV. It offers 165 bachelor's, master's, doctoral, and professional degree programs through fourteen (14) colleges and schools. The majority of the RSPAC staff is housed in NASA's Software Independent Verification and Validation (IV&V) facility in Fairmont, WV. Additional support is provided by staff near NASA's Ames Research Center (Moffett Field, CA), BDM Headquarters (McLean, VA), and BDM Interactive (Albuquerque, NM).

3.0 IITA SUPPORT

— — RSPAC provides technical and programmatic support to all IITA projects. This includes services which range from making experts available to answer questions to direct computer and technology support. RSPAC can be thought of as a job shop for the IITA and its projects. The two main areas in which RSPAC provides support to the IITA projects are collaboration and coordination, and technical and Web support. Within this document, the IITA projects may also be referred to as Cooperative Agreement Teams (CATs).

3.1 COLLABORATION AND COORDINATION

— — One of RSPAC's charges is to foster communication and collaboration among the IITA projects. RSPAC disseminates information to the projects in a timely manner using a variety of mechanisms. These include the Developers' Workshop (a Web site for IITA projects), listserves, IITA conferences, the *IITA Bulletin* (a newsletter), telecon courses, and workshops.

DEVELOPERS' WORKSHOP *(developers.ivv.nasa.gov)*

— — The Developers' Workshop is a Web site established for the IITA project teams to allow the exchange of technical information and to share IITA/NASA announcements. This Web site is the mainstay of RSPAC's collaboration and coordination efforts. It is the central clearinghouse where NASA and the IITA projects exchange information. Typical information on the site includes extensive project contact and abstract information, discussions of technical Web issues, RSPAC-developed Web software tools, Earth and space data repository catalogs, an *IITA Bulletin* archive, and a description of available RSPAC services.

1996-1997 Accomplishments

- The Developers' Workshop Web site was reorganized in February 1997. Navigation of the site was simplified and frequently used areas were directly linked to the homepage. Monthly issues of the *IITA Bulletin* are archived and IITA conference announcements and registration information continue to be posted.

IITA BULLETIN *(developers.ivv.nasa.gov/collab/pubs/bulletin/)*

— — The *IITA Bulletin* (formerly the *PI Bulletin*) is a monthly newsletter distributed to NASA, the IITA projects, and other interested parties. It provides recipients with timely information about NASA's IITA initiative, the progress of specific IITA projects, and multimedia/Internet information from RSPAC's graphics and technical staffs. The *IITA Bulletin* is now produced by RSPAC using Adobe's Acrobat software (beginning with the March 1997 issue; prior to that the bulletin was in HTML format). It is distributed to 120 e-mail recipients and over 140 paper copy recipients, and is available on the Internet. The major sections of each bulletin are:

- News from NASA
  Timely information from the IITA project director, NASA Ames, NASA Goddard, and NASA Center-Based K-12 Education Outreach is presented.

- News Bytes
  Short and informative articles about IITA and other matters of interest to the CATs are highlighted.

- Nothin' but Net
  Web technology tips and innovative project highlights are shared by the RSPAC graphics and technical staffs.

- Cool Links
  Aeronautics, Earth science, education, and space science Web sites are featured to expose readers to related Internet projects.

- All about CATs
  In their own words, IITA project staff members inform readers about their respective activities.

- CAT in the Spotlight
  This is an occasional feature in which an IITA project shares its experiences.

1996-1997 Accomplishments

- News from NASA and News Bytes articles throughout the year included these topics:

  - The Next Generation of IITA — transition of the IITA to the Learning Technologies (LT) project
  - IITA conferences
  - The NASA IITA product guide
  - A toll-free telephone number for teachers interested in IITA
  - Awards won by Exploring the Environment (ETE), NASA's IITA, and Observatorium Web sites
  - "Exploring the Internet with NASA" CD-ROM
  - New funding opportunities
  - The availability of RSPAC teleconferences on Web site production and design
  - RSPAC's newest automated Web testing service

- Nothin' but Net articles covered tips on Web site design, layout, navigation, interactivity, audience, and promotion. Some of the articles were:

  - "Increasing Your Hits: Search Engines" (a primer for getting a Web site listed prominently by Internet search engines)
  - "Increasing Your Hits - Linking Up" (suggestions for increasing Web site traffic)
  - "To GIF or Not to GIF" (tips on GIF animation's benefits to Web sites)
  - "A Word on the Web" (information about HTML editors)
  - "Internet Sites - The Next Generation" (the evolution of Web layout)
  - "Using the Right Technology" (tips on online animation)
  - "Design with a Theme" (suggestions on Web site design)
  - "Navigation - The Long Way Home" (offers tips on helping visitors navigate through a Web site)
  - "Survey Says!" (the results of an extensive Web user survey)
  - "Adding QuickTime Movies to a Web Site"
  - "Various Means of Web Promotion"
  - "Web Site Target Audiences"

- The *IITA Bulletin* proved to be a good place for sharing project experiences. Submissions for the All about CATs section were received from the following CATs:

  - Ames Research Center's IITA projects: Quest, Shuttle Team Online, and Women of NASA
  - Athena (SAIC)
  - Aviation Academy 2000 (Wooddale High School)
  - Emergency and Crisis Management (University of North Texas)
  - Everyday Classroom Tools (Smithsonian Astrophysical Observatory)
  - Exploring the Environment (Classroom of the Future)
  - FIFE's Internet Weather Explorer (TASC)
  - K-8 Aeronautics Internet Textbook (Cislunar Aerospace)
  - LDAPS — LEGO Data Acquisition and Prototyping System (Tufts University)
  - Live From Earth and Mars (University of Washington)

- Live from Mars — a Passport to Knowledge project (The Childhood Project)
- PlaneMath (InfoUse)
- Project Horizon (NCSA)
- Public Connection (Rice University)
- Science Information Infrastructure (University of California at Berkeley)
- SHAPE — SHaring Aeronautics Projects Electronically (Antelope Valley Union High School District)
- Space Available (Gulf of Maine Aquarium)
- SPARK — Student Program for Aeronautics Resources and Knowledge (University of Idaho)
- Take Off! (Massachusetts Corporation for Educational Telecommunications)
- WeatherNet4 (WRC-TV4)
- Windows to the Universe (University of Michigan)
- YPOP — Yohkoh Public Outreach Project (Lockheed)

[redacted]ON COURSES *(developers.ivv.nasa.gov/telecon)*

— — — In an effort to share the knowledge of members of the RSPAC staff with interested IITA projects, RSPAC has established virtual conferences. The virtual conferences (telecon courses) are taught by RSPAC staff and conducted via teleconference (or videoconference) with instructional materials made available via the Internet and paper copies. Telecon courses cover many of the issues and problems that Web professionals face in the creation and maintenance of their sites. Below is a listing of the course descriptions:

Search Engines — Offers a basic understanding of how search engines work, how to get a site listed on search engines, and how to make a site attractive to search engines.

Web Servers — The basic and advanced features that are available on most Web servers are addressed, and customization of the Web server configuration for a site is discussed.

Web Statistics — Introduces the types of data collected by servers and teaches how the data can be used to improve a Web site.

Current and Emerging Web Technologies — The technologies that are prominent on the Web now are discussed, as well as emerging technologies that will be the standards of the future.

How the Web Works — Users will learn what acronyms like HTTP, URL, and MIME mean, and how they relate to the Web.

Web Production Environment — Addresses creating a set of guidelines for a site, making the production environment user-friendly, and discovering the tools that are available to create Web pages.

Designing a Web Site — An introduction to the design process needed to establish an effective online presence. Planning, design, theme development, visual imagery, and other essentials are discussed in detail.

GIF Animation — An introduction to GIF animation and reasons to implement it within a Web site. Limitations and advantages of this program in relation to browsers, Shockwave, and Java are addressed.

Introduction to Computer Graphics — Adobe Photoshop is the premier graphics application for developing computer-generated designs. Topics of discussion include tools, file formats, palettes, special effects, and filters.

1996-1997 Accomplishments

- RSPAC held a teleconference with members of Quest (Ames IITA project) — the first in a mini-technical seminar on Web issues and solutions. The issues covered included search engines, Web servers, Web statistics, and the Web production environment. The telecon took the form of an informal question and answer session on project-specific Web technology issues.

- RSPAC conducted a four-hour telecon series with the BADGER/BASIC project. The classes presented addressed search engines, Web servers, Web statistics, current and emerging Web technologies, how the Web works, Web production environments, and designing a Web site. The classes were conducted using NASA's VITS video-teleconferencing facility.

[redacted]NFERENCES

— — — The IITA project office hosts annual conferences as a means of bringing together the IITA projects to share experiences and showcase accomplishments. RSPAC supports the IITA project management by assisting in the logistics, programming, and coordination of these conferences.

1996-1997 Accomplishments

- RSPAC provided services and staff to the IITA for the preparation and organization of the fall 1996 IITA conference, held at NASA Headquarters in Washington, DC, September 16-18. In support of the conference, RSPAC:

  - created Web pages on the Developers' Workshop Web site for conference announcements, general information, and online conference registration.
  - conducted a computer needs analysis for the NASA auditorium and lobby and developed the layout and design of the lobby and auditorium areas.
  - developed graphics for display in the NASA lobby and auditorium.
  - supplied many of the computers needed for the lobby displays and coordinated the network connections, computer needs, and display requirements for all participants.
  - managed many of the financial arrangements for the conference, such as catering, supplies, and funds collection.
  - collected and distributed complimentary education and Web technology publications (i.e., *IEEE Computer, Web Developer, WebWeek, Technology Connection, Classroom Connect, NSTA Publication Catalog*, etc.).
  - conducted a presentation for all conference attendees entitled "New and Emerging Web Technologies."
  - staffed a RSPAC booth full-time in the display area of the conference.

- RSPAC supported the spring 1997 IITA conference, held in Sunnyvale, CA, May 19-21, by:

- creating Web pages for the conference to allow for the posting of up-to-date information.
- establishing an online registration and computer requirements section on the Developers' Workshop. Data collected via this Web site was used to create badges and develop the CATs' computer needs.
- collecting product profile information from principal investigators for inclusion in the IITA product guide.
- compiling the *NASA Information Infrastructure Technology and Applications Product Guide*. The product guide can be found online (*iita.ivv.nasa.gov/products*).
- paying for the Space Camp expenses (conference reserve funds were used).
- inviting industry participants to attend the evaluation session.
- hosting the product evaluation session.
- setting up a display booth to act as a backdrop and to showcase the IITA.
- showcasing RSPAC's products, NASA's Observatorium, and the "Exploring the Internet with NASA" CD-ROM.

AL AND WEB SUPPORT

— — — The RSPAC staff is a combination of scientific and technical (computer science and graphics) professionals. This staff is made available to the IITA projects as needed — to answer a question or two or as direct augmentation to the projects by providing services such as Web site mirroring, test and evaluation, and other Web-related assistance.

TECHNICAL SUPPORT

— — — RSPAC's space and Earth science experts are a resource that other projects can call on to answer technical questions. Each of these two professionals has over twenty years of experience in his areas of expertise (space science, astronomy, Earth science, and remote sensing).

RSPAC has provided many of the IITA projects with Web site development assistance. This has ranged from minimal graphics support (creating an illustration) to full-fledged Web site development (turnkey solutions). The latter is best expressed by the request received from NASA IITA to create a new Web site to explain and showcase its activities to the general public (*iita.ivv.nasa.gov*).

1996-1997 Accomplishments

■ **Web/Graphics Support**

This activity is conducted in collaboration with the CAT projects and the RSPAC graphics staff. It includes Web site organization and layout suggestions, original graphics for logos, backgrounds, and key site elements.

- Graphics were created for:

  LDAPS (Tufts University) — *ldaps.ivv.nasa.gov*
  Off to a Flying Start (Langley IITA project) — *k12unix.larc.nasa.gov/flyingstart/*
  Shuttle Team Online (Quest - Ames IITA project) — *quest.arc.nasa.gov/shuttle/*

SPARK (University of Idaho) — *nasaui.ited.uidaho.edu*

- Site/page design and graphics were created for:

  Live from Mars - A Passport to Knowledge project (The Childhood Project) — *quest.arc.nasa.gov/mars/*
  TiSDat (University of Wisconsin) — *www.soils.wisc.edu/nasacan.html*
  Quest (Ames IITA project) — *quest.arc.nasa.gov*

- Graphic redesign, content streamlining, and copyediting assistance were provided to:

  Women of NASA (Ames IITA K-12 project) — *quest.arc.nasa.gov/women*

■ **IITA Web Site Support**

The IITA Web site *(iita.ivv.nasa.gov)* is administered by RSPAC. Accomplishments for the year include:

- Updated the "Highlights and Happenings" section of the site to include NASA's contribution to NetDay96.
- Updated the site to include new sections, graphics, QuickTime movies, a newly re-indexed search capability, project descriptions, and a listing of project summaries along IITA management lines (RSD, DLT, K-14, K-12).
- Added an article on "Shuttle Team Online" to the "Highlights" section of the site.
- Created an "Events" calendar section.
- Reorganized the "What We're Doing" section of the site.
- Incorporated the online version of the NASA IITA product guide into the site.

■ **Programming Support**

RSPAC is sometimes called upon to install software to support mirror sites, develop programs, or modify existing programs for the CATs. The projects who requested these services are listed below.

- LDAPS (Tufts University) — RSPAC helped to configure this Web site with a Web interface to an e-mail listserve using the Monarch software package.
- Live from Antarctica 2 - A Passport to Knowledge Project (The Childhood Project) *AND* Virtually Hawaii (University of Hawaii) — The Observatorium's online games were modified to be used on the Web sites of both of these projects.
- Women of NASA (Ames IITA project) — RSPAC created the JavaScript necessary to allow for rotation among several opening images on the Women of NASA homepage.

[redacted]SITE MIRRORS *(aya.ivv.nasa.gov/~padm/mirrors.html)*

— — RSPAC has a staff of trained and competent Web professionals who are familiar with all aspects of managing large Web installations. In an effort to share this knowledge and relieve some of the burden of Web site administration, RSPAC has established a Web mirror service for the IITA projects.

RSPAC maintains a suite of Web servers on which the IITA projects can host their Web sites. This is similar to the services offered by commercial Internet Service Providers (ISPs). These servers are managed by RSPAC staff to ensure that they are

constantly operational and can withstand the demands of a high-traffic Web site. In the past year, these servers have sustained over 42 million hits, with an average of 3.5 million hits per month. The IITA projects listed below have mirrors at RSPAC:

Athena (*www.athena.ivv.nasa.gov*)
Classroom of the Future (*cotf.ivv.nasa.gov*)
FIFE *(fife.ivv.nasa.gov)*
Galileo (non-IITA) (*galileo.ivv.nasa.gov*)
Gulf of Maine Aquarium (*octopus.ivv.nasa.gov*)
Hubble Space Telescope (*hst.ivv.nasa.gov*)
IITA *(iita.ivv.nasa.gov)*
LDAPS (*ldaps.ivv.nasa.gov*)
Live from Antarctica 2 *(lfa.ivv.nasa.gov)*
Live From Earth and Mars *(mars.ivv.nasa.gov)*
SAIRE (*saire.ivv.nasa.gov*)
SPARK *(spark.ivv.nasa.gov)*
Virtually Hawaii *(hawaii.ivv.nasa.gov)*
Windows to the Universe *(windows.ivv.nasa.gov)*

1996-1997 Accomplishments

- The following mirror sites were established during the past year:

  - Galileo program (JPL)
  - FIFE — Friendly Internet Front End (TASC, Inc.) project
  - SPARK (University of Idaho) project
  - Exploring the Environment (Classroom of the Future [COTF])
  - Live from Earth and Mars (University of Washington)

[redacted]ITE TEST AND EVALUATION

The RSPAC Web development staff has created a service that can test and evaluate the structure and integrity of a Web site. The testing is performed by RSPAC-developed automated software tools and by experienced staff who validate portions of a Web site by evaluating subjective items such as layout, design, and correct copy.

The test and evaluation (T&E) process consists of six tests, beginning with a Web robot that is given a starting URL. The robot then collects and follows links until it has mapped out all the links in a site. This list of unique URLs is then fed to three software checkers:

Link Verifier: Verifies that each link on a Web page goes to a valid element and that the Web server transmits the element. It also verifies that each URL actually exists.

HTML Verifier: Checks the code of each Web page for adherence to HTML standards and generates an errors report.

Download Time Verifier: Reports the time needed to transmit a complete Web page, including all graphics elements. Varying network connections (28.8 modems and T1) are used to approximate a site's user community.

An additional automated test is used to determine the relative listing of a site on major search engines:

Search Engine Verifier: Six of the most popular search engines are searched to see if the Web site is listed within the top 100 entries on that Web page. The searches consist of three keywords that are placed together in various combinations.

In addition to the automated tests, manual testing of Web pages is done:

Copyeditor Review: A representational section of the site is reviewed by the copyeditor for grammatical and punctuation errors and for inconsistencies in style.

Page Rendering: A RSPAC reviewer will view a site under various browsers and operating systems and look for pages that render so badly that the intent of the page is lost.

For a full description of the RSPAC Web test and evaluation service, see the T&E section on the Developers' Workshop (*developers.ivv.nasa.gov/tech/tne/tne.html*).

1996-1997 Accomplishments

- **Site Test & Evaluation.** To make the T&E service easier for CATs, any of the six tests could be requested. Full T&E consisted of the entire suite of tests being run against a site. Partial T&E usually consisted of some of the automated tests being run, and may also have involved the manual tests described above.

  - Full T&E services were performed for:

    ALL STAR (Florida International University)
    www.allstar.fiu.edu/

    BADGER/BASIC
    www.basic.org

    Earth System Science Community (ECOlogic)
    www.circles.org

    Lewis Research Center (LeRC) IITA K-12 project
    www.lerc.nasa.gov/WWW/K-12

    Live From Earth and Mars (University of Washington)
    www-k12.atmos.washington.edu/k12/

    Mars Pathfinder (JPL)
    mpfwww.jpl.nasa.gov

    Space Available (Gulf of Maine Aquarium)
    octopus.gma.org

SAIRE (Lockheed)
saire.ivv.nasa.gov

Science Information Infrastructure (University of California at Berkeley) and museum partners
www.cea.berkeley.edu/Education/sii/sii_sii.html
www.cea.berkeley.edu/Education/sol/sol_homepage.html (Science On-Line)
www.exploratorium.edu (Exploratorium)
www.lhs.berkeley.edu/ (Lawrence Hall of Science)
ceps.nasm.edu:2020/SII/SII.html (National Air and Space Museum)

SHAPE (Antelope Valley Union High School District)
www.shape.k12.ca.us

Women of NASA (Ames IITA K-12 project)
quest.arc.nasa.gov/women/

- Partial T&E services were performed for:

Athena (SAIC)
www.athena.ivv.nasa.gov

BADGER/BASIC
badger.parl.com/
www.basic.org/

SHAPE (Antelope Valley Union High School District)
www.patprojects.org
www.shape.k12.ca.us

Urban Environment Initiative (Prime Technologies)
muspin.gsfc.nasa.gov/Prime/

VolcanoWorld (University of North Dakota)
volcano.und.nodak.edu

Windows to the Universe
windows.engin.umich.edu/

■ **T&E Software Development.** The RSPAC T&E automated software underwent an extensive upgrade and has now taken on the name MoNsTeR!! (version 1.0). The upgrade consists of many new features, the most prominent of which allows the robot to traverse password-protected sites. The download timer software was also upgraded to increase its accuracy. The current version now provides download times accurate to hundredths of a second. RSPAC also created an addition to the Web T&E process to record the relative listing of a site on the major search engines.

WEB SITE STATISTICS ANALYSIS *(The Inquisitor)*

(developers.ivv.nasa.gov/tech/nothin.html)

— — The Inquisitor is a program that interrogates and analyzes Web server logs and displays the results in a user-friendly HTML format. In addition to standard graphs showing server hits, The Inquisitor features customizable results, the ability to see the path a user takes through a Web site (threads), and a "referrer" table that shows how the user found the site.

This Web log analysis tool is able to provide summary information for multiple mirrors and separate content areas on a server. One of its most useful features is its ability to be configured to include or exclude data from its graphs and output tables. Some of the features include:

- Daily Hits — a graph of the number of accesses (hits) the site received over a four-week period
- Hourly Graphs — the number of hits a server received during each hour of the previous day
- Hits per Page — the number of times a page was requested from the server for the previous day
- Threads — a list of pages that a user looked at during a visit to the site
- Referrers — the last site a user visited before coming to the site (excellent for characterizing an audience)
- Browsers — a pie chart showing the percentage of each type of browser used to access the site during the previous week
- Domains — hits divided by domain for the previous day
- Errors — errors that occurred during the previous day
- Monthly Report — a monthly synopsis of Web activity

1996-1997 Accomplishments

- The following sites were assisted in installing and configuring The Inquisitor:

  - The Galileo mirror site
  - Quest (Ames IITA project)
  - Athena (SAIC)
  - BADGER
  - The Gulf of Maine Aquarium

OUTREACH

— — RSPAC conducts many activities in an effort to disseminate information about NASA, IITA projects, Earth and space science, and the Internet. Many of RSPAC's outreach efforts are conducted on the Internet via Web sites, but CD-ROMs, multimedia kiosks, printed publications, and conferences are also used to reach the widest audience possible.

OBSERVATORIUM WEB SITE *(observe.ivv.nasa.gov)*

— — In September 1995, RSPAC opened NASA's Observatorium, a Web site providing information for the general public about the IITA projects and NASA's science and engineering activities. The site is designed to appeal to a broad audience, with infor-

mation presented in an educational and informative manner. Appropriate Web technologies, including Java, Director, and Shockwave, are used to bring the excitement of NASA science to the public through articles and features in a magazine-like environment.

On an average day, the Observatorium receives about 33,000 hits from Web visitors, or around 1 million hits per month. Usage is increasing dramatically. Over 450 other Web sites around the world are linked to the Observatorium. The entire site is mirrored in Japan, and the Landsat TM data set section is reproduced at the University of Salzburg in Austria.

The structure of the Observatorium broadly follows the NASA "enterprise" topics. RSPAC has developed articles under such headings as Aeronautics, Earth Science, Space Science, and Human Spaceflight. In addition to a Search tool and an Image Gallery, there are also top-level sections for Education, and infotainment under Fun & Games.

[redacted]NT

— — — Observatorium articles showcase NASA science in action. They are usually developed around a story that will entertain and inform the public about scientific topics. Many articles are written to highlight material developed by other IITA projects, and IITA projects are linked to an article whenever possible.

[redacted]

- A major activity during the past year was to redesign the Observatorium. This meant more than just changing the graphics and appearance of the site. Since the Observatorium had begun to outgrow its structure, the RSPAC team carefully studied other Web sites for appeal and function and incorporated many advanced techniques into the Observatorium upgrade. The new pages are designed to load quickly, have a light, open look, be easy to navigate, and provide more topics. In addition, the Observatorium is more flexible and is able to offer a broader range of topics, reflecting the maturing nature of IITA and the CATs. The redesigned and restructured Observatorium went online on March 14, 1997. Response from Observatorium visitors has been overwhelmingly favorable.

- During 1996-1997, Observatorium team members produced and posted fifty-four (54) *Observations of the Week*, ninety-one (91) *Headlines*, and thirty (30) new, major *Articles*.

  - **Observations of the Week** — Each week at least one new Observation of the Week (OOTW) is posted on the Observatorium. These short pieces with images contain links to Web resources, especially IITA CATs that can provide additional information on that week's topic. The OOTWs are timely and informative, and respond to items of general public interest whenever possible. For example, because of the widespread interest in comet Hale-Bopp, an OOTW on that subject was kept active for over a month. Similarly, the calendar year began with an extended OOTW promoting the planned Mars missions. That OOTW was kept posted for over two weeks, and the Observatorium promoted additional public interest in Pathfinder, Sojourner, and the Mars orbiters. All these were timed to coincide with the actual landing.

- **Headlines** — During the year, ninety-one (91) *Headlines* were posted. These were usually a summary of a press release from NASA or some other scientific/ engineering organization.

- **Articles** — *Articles* are the mainstay of the Observatorium. Over the past year, RSPAC developed and posted thirty (30) new articles and upgraded six (6) previous articles to give them an appearance that is consistent with the site redesign. The articles posted during the previous year are described below.

■ **Aeronautics**
(*observe.ivv.nasa.gov/nasa/aero/aero_index.shtml*)

NASA's ER-2 High-flying Science describes the characteristics and uses of the ER-2 aircraft in high-altitude atmospheric research, aerial photography, disaster assessment, and sensor systems development.

SR-71: Speed in the Service of Science highlights the SR-71 program at Dryden Flight Research Center. The article provides basic information on the aircraft and how NASA uses it for research. Several animations and an interactive Java applet are used to enhance understanding of this aircraft and NASA's applications.

■ **Education**
(*observe.ivv.nasa.gov/nasa/education/edu_index.shtml*)

NASA Education Projects is where the CAT projects are listed, the IITA project is highlighted, and access is provided to products being developed by educators, scientists, and technologists under cooperative agreements with NASA. The material is organized in a matrix by grade level and topic. Included are links to NASA's Education Program homepage and the K-12 Education Outreach programs at NASA centers.

Remote Sensing Resources contains four (4) new Reference Desk modules. They contain information about Thematic Mapper data, principles of multispectral remote sensing, reflected infrared energy, and thermal remote sensing methods.

■ **Fun & Games**
(*observe.ivv.nasa.gov/nasa/fun/fun_index.shtml*)

Fun & Games provides Observatorium visitors with games that are not only fun, but also educational. Below is a summary of each.

Concentrate! - An example of the classic matching game based on Concentration. This Java-based version uses NASA images.

Slider Puzzle - Java version of a child's tile puzzle. The object of the game is to construct a NASA picture by arranging the tiles in the proper order.

Earth at Night - An educational game that asks a player to identify major North American and European cities as seen on nighttime satellite imagery.

Where in the World? - A city/area identification puzzle in which the player guesses the location of a place shown on a satellite image; clues are provided to help the player if needed.

Observatorium Postcards - Send an electronic postcard from the Observatorium to a friend. A visitor can choose from several designs and enter a custom message.

SR-71 Flight Time Calculator - Java is used to determine how long it would take an SR-71 to fly between any two places in the world!

Mars Lander - The Observatorium's updated version of the old "lander" game. This is an interactive Java-based game testing skill and dexterity.

■ Image Gallery

(*observe.ivv.nasa.gov/nasa/gallery/image_index.shtml*)

Image Gallery covers a range of topics with popular images and movies from NASA and other sources. Also displayed are images from amateur astronomers and photographers, as well as children's art reflecting a space theme. The Image Gallery includes:

Movie Gallery is a collection of NASA movies in MPEG and AVI formats. The movies cover such topics as the solar system, aeronautics, spaceflight, spacecraft, and weather.

Gallery contains images collected under several subcategories. The major subtopics include the Universe, Solar System, Spacecraft, Earth, Moon, Spaceflight, Aeronautics, and Artwork.

Around the World in Eighty Scenes provides Landsat imagery of eighty (80) areas around the world. Images include major urban areas and pre- and post-hurricane examples. All come with descriptive information for the visitor.

US Capitals provides access to downloadable Landsat TM images of the capital city of each state.

■ Planet Earth

(*observe.ivv.nasa.gov/nasa/earth/earth_index.shtml*)

Planet Earth illustrates NASA's efforts to understand how the Earth is changing and how human beings influence, and are influenced by, these changes. Included here are:

The Search for Ubar was redesigned using Macromedia's Shockwave technology. The "shock'd" version contains music and interactive multimedia to give the reader an enhanced Web experience.

SPY! makes extensive use of recently declassified satellite images. Details about the CIA's CORONA and Keyhole programs are given, as well as instructions for visitors to access the declassified images. The article makes extensive use of animation to illustrate technical information.

Landsat Data Sets provides visitors with access to raw remote sensing data. Key to this section are twenty-eight (28) TM data sets and the tools and instructions needed to process them. The "Step-by-Step" section provides the visitor with a graphical tutorial explaining how to do simple image processing on the raw TM data sets. The University of Graz, in Austria, reproduces this section on its Web site for educational purposes.

■ **Search**
(*observe.ivv.nasa.gov/nasa/search/search_index.shtml*)

Observatorium content is "full text indexed," so a visitor can search every word of every page at the site. The Index portion of the Search area operates like an interactive table of contents, and a Site Structure Map provides a hypertext map of the site. Clicking on any portion of the map will take a visitor directly to that section.

■ **Spaceflight**
(*observe.ivv.nasa.gov/nasa/spacefly/spacefly_index.shtml*)

Toys in Space illustrates the experiments conducted by shuttle astronauts on STS-54 to see how common children's toys would react in microgravity.

Space Traveler's Handbook provides links to topical Web sites with information on astronauts, how to become an astronaut, the International Space Station, reusable launch vehicles (RLVs), the space shuttle, and Russia's Mir space station.

■ **Space Science**
(*observe.ivv.nasa.gov/nasa/space/space_index.shtml*)

This section provides information on NASA's planetary and deep space exploration programs, astronomy, and the origins of life. Articles from the previous year are described below.

Mystic Mars is a major article consisting of several sections that provide information about voyages, missions, and life on Mars. The article includes the following sections:

Are We Really Martians? is a look at the possibility that a meteorite found in Antarctica came from Mars and could contain fossils of Martian bacteria 3.6 billion years old.

A Voyage on the Surface of Mars presents the Observatorium visitor with an imaginary voyage on the Martian surface investigating the pre-Pathfinder geology of Mars and searching for clues to the past.

Missions to Mars is an overview of past successful missions to Mars and present missions on their way to the red planet, including Pathfinder.

Pathfinder Images and the *Mars Image Grab Bag* provide images received by JPL from the Pathfinder mission and other Mars images, old and new.

Mars Lander is RSPAC's version of the old video game "Lunar Lander." This is an interactive Java-based game testing skill and dexterity.

Birth of Stars is an article that includes clear explanations of interstellar clouds (the birthplaces of stars), a discussion of the processes involved in the birth of a star, descriptions of young star clusters, and how the births of new generations of stars are triggered.

Our Sun provides information about our Sun, how we depend on it, what ancient cultures thought about it, and how the Sun works. There is a strong tie-in with the IITA project Yohkoh.

[redacted]DS AND MEDIA COVERAGE

— — — NASA's Observatorium has been selected for several awards since it first went online, and received a number of additional awards during the past year. As a result of a more aggressive marketing campaign, media coverage increased dramatically.

[redacted] Accomplishments

- Awards presented to the Observatorium during the past year:

  - 5-Star Blue Web'n Educational Site
  - Luckman Interactive's Five-Star Award
  - Remote Sensing Site of the Week (for two and a half weeks)
  - Discovery Channel School Selection
  - InterNIC Scout Report Featured Site
  - Cool Central Site of the Hour
  - Cool Earth Site of the Week
  - Cool Site of the Hour (twice)
  - Project Cool Sighting
  - Bell Atlantic WORLD SCHOOL "Best Bets for the Classroom"

- Major media featuring stories on NASA's Observatorium included:

  Newspapers

  Alliance (OH) *Times-Herald*
  Central Michigan Life
  Dominion Post (Morgantown, WV)
  Florida Today
  Florida Today Space Online
  Hartford (CT) *Courant*
  InJersey/Asbury Park (NJ) *Press*
  Kansas City Star
  Los Angeles Times
  Madison (WI) *State Journal*
  Minneapolis Star Tribune
  Muncie (IN) *Star Press*
  New York Times
  News Orleans Times-Picayune

Roanoke Times
Salt Lake City Tribune
San Antonio Express News
Southwest Michigan News Herald
Toronto Star
USA Today
Washington Post

Periodicals and Web 'Zines

Astronomy
Ames Astrogram
Canadian Broadcasting Company Magazine
Education News
Excite News Channel Magazine
Global School Net
Java Travel Cup
Machine Design
NASA Educational Horizons
The Mining Company; Science for Kids
PC Hemma (Sweden)
Sky & Telescope
Yahoo! Internet Life

- Regional broadcast media coverage of NASA's Observatorium included:

  WTAE-TV (ABC affiliate), Pittsburgh, PA
  WBOY-TV (NBC affiliate), north central West Virginia
  WDTV-TV (CBS affiliate), north central West Virginia

- The Observatorium article on the electromagnetic spectrum, part of the Remote Sensing Resources section, was listed as an information source in Yahoo's Physics section. This listing was responsible for a number of hits to the Observatorium, especially during the school year.

[redacted]TION

— — — RSPAC promotes IITA, NASA's activities, and NASA's Observatorium through a variety of publicity measures, particularly electronic mail, video and print public service announcements, and RSPAC-designed and written distributables.

[redacted] Accomplishments

- In September 1996 RSPAC implemented an aggressive promotional campaign via electronic mail that reaches over 800 news outlets — virtually every daily newspaper in the US. The media portion of the list targets those newspapers' editors, departmental editors, and science and education reporters. Also included in the list are more than 2,000 Observatorium guestbook signees who have requested electronic information about the Web site.

- Distributed a total of forty-eight (48) news releases to the media and guestbook

signees on the mail list. This promotional effort, carried out on a weekly basis, has been extremely effective, as demonstrated by the greatly increased media coverage of the Observatorium. This coverage directs new visitors to the site and often prompts repeat visits from guestbook signees. Traffic has increased by 75% over last year, with the Observatorium averaging over 1 million hits per month.

- In August 1996, RSPAC contracted an advertising agency, Hoffman York of Milwaukee, WI, to produce one thirty-second video public service announcement (PSA) and four accompanying print PSAs for NASA's Observatorium and IITA. The video PSA is being incorporated into existing NASA promotional videos and will be distributed to public access channels across the US. Individual video PSAs will also be distributed to television stations and cable networks across the US. The print PSAs will be distributed nationally to general interest and niche publications.

- RSPAC has produced, in-house, marketing items that promote IITA and the Observatorium. The distributables include:

  - *Brochure.* A tri-fold promotional brochure that showcases IITA and the Observatorium, written for a general audience and distributed at national and regional conferences and other functions.

  - *Postcard.* Full-color postcards promoting the Observatorium are also distributed at national and regional conferences and other functions.

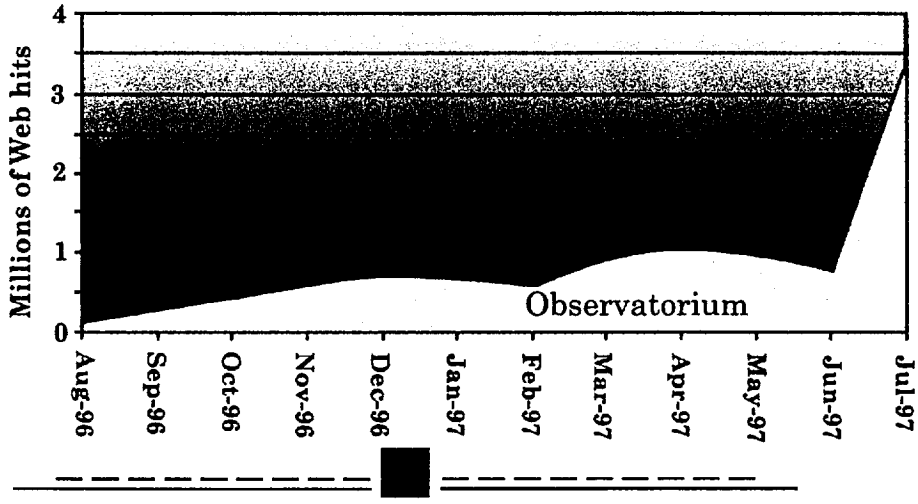
  - *Articles.* RSPAC staff write and submit articles on the Observatorium and IITA for inclusion in educational newsletters and other publications. One such article appeared in the December 1996 issue of *Educational Horizons*, a national newsletter for high school teachers.

[redacted]TATISTICS

— — — Statistics about the Observatorium are routinely collected and analyzed using the Inquisitor software described above in 3.2.4 Web Site Statistics Analysis.

[redacted]

NASA's Observatorium experienced a significant increase in traffic over the past year. The Web site now averages around 1 million hits per month (up from an average of 200,000 per month the previous year).



The increase in traffic is the result of the weekly news releases and additional Observatorium articles on interesting and timely topics. For example, the interest in comet Hale-Bopp in early 1997 led to a dramatic increase in traffic. Similarly, RSPAC promoted the Mars landing throughout the first half of 1997, and, for several days after the landing on Mars, Observatorium traffic was around 0.5 million hits per day, leading to a monthly total of around 3.5 million hits.

[redacted]MOTION

— — — RSPAC attends numerous national and regional conferences and workshops to promote the IITA, its projects, and RSPAC activities. The majority of these conferences are geared toward people in the education profession. RSPAC will typically establish a presence in the exhibit area of the conference, demonstrate IITA projects, and distribute informational material (brochures, CD-ROMs, videos, etc.). In addition to exhibiting at conferences, RSPAC has conducted many workshops that have covered Web site development and design, and presented information about NASA educational materials that are available to educators.

[redacted]1996-1997 Accomplishments

■ **Conferences**

- RSPAC attended the Pecora 13 Symposium in Sioux Falls, SD. The conference provided a venue for the international remote sensing community to exchange information on the ways in which remote sensing is being used to understand and evaluate human impacts on the Earth. RSPAC participated in the conference to stay current in the field of remote sensing and to promote the activities of the IITA and RSPAC.

- RSPAC exhibited at the West Virginia Science Teachers Association annual statewide conference, which was attended by more than 800 educators. Staff gave demonstrations of the Internet tutorial, the Rice University "CONNECTED" CD-ROM, and the Classroom of the Future's "Astronomy Village" and "BioBlast" CD-ROMs. Brochures were distributed for Windows to the Universe (University of Michigan), Athena (SAIC), Science Information Infrastructure (UC Berkeley), ALL STAR (Florida International University), and The Public Connection (Rice University). RSPAC conducted a presentation on NASA Online Resources which gave an overview of the IITA and its projects.

- RSPAC staff chaired a panel discussion on "Experiences in Internet-Based Science Education" at the NSTA Global Summit in San Francisco on December 28. Panelists included representatives from SII, PlaneMath, and a local school, as well as an educational consultant. RSPAC staffed the IITA booth at the convention and distributed information on IITA, SII, Windows to the Universe, Passport to Knowledge, Athena, RSPAC, and other NASA education projects.

- RSPAC staff also attended or distributed materials at the following conferences:

  National Science Teachers Convention, New Orleans, LA

  Advances in Digital Libraries (ADL) conference, Washington, DC

Consortium for School Networking (CoSN), Washington, DC

Federal Office Systems Expo (FOSE), Washington, DC

Classroom Connect conference, Philadelphia, PA

National Educational Computing Conference (NECC) '97, Seattle, WA

NASA Multimedia Developers' Conference, Wheeling, WV

- Throughout the year RSPAC distributed approximately 2,500 IITA bookmarks, 5,000 Observatorium postcards, 4,500 Observatorium stickers, 4,500 Observatorium pens, CAT brochures, and NASA education publications.

■ **Other Promotional Activities**

- RSPAC maintains a traveling booth to use as a background display at conferences. New graphics and layout for the booth showcase the theme "NASA Communicating Science." The new booth graphics were shown for the first time at the fall IITA conference.

- RSPAC created an IITA bookmark (paper copy) which consists of a brief description of the IITA and includes the URLs of all the IITA projects grouped by education, remote sensing applications, and digital library technology. The bookmarks have been favorably received and several CATs have requested copies for distribution.

■ **RSPAC also distributed:**

- a nationwide news release on "Shuttle Team Online" to the RSPAC news media mailing list.

- a news release about the Classroom of the Future's (COTF) Web site which featured its volcanic content and coincided with the theatrical release of *Dante's Peak.*

- a nationwide news release on "Virtual Take Our Daughters to Work Day" to the RSPAC news media mailing list.

[redacted]ON OUTREACH

— — — Through direct involvement with West Virginia schools, RSPAC provides IITA- and NASA-derived educational materials to educators. RSPAC collaborates with local students and educators to bring its Internet and NASA knowledge into their classrooms.

[redacted] Accomplishments

■ RSPAC staff members assisted in Camp MASTER (a summer math, science, and technology camp for gifted students) in Logan, WV. RSPAC showcased the IITA projects to all the education professionals in attendance, conducted a technical seminar on creating Web pages, and field-tested a remote sensing activi-

ty. RSPAC assisted in the development, graphic design, and layout for the WILD PAGE, an online identification directory for native West Virginia plants and animals (*168.216.220.8/~wildpage*).

- RSPAC staff attended and presented at the West Virginia North Central Regional Education Service Agency's (RESA VII) education conference. The conference was a one-day enhancement workshop for over 800 West Virginia teachers. RSPAC conducted multiple sessions of two presentations, staffed a display booth, and distributed NASA educational materials.

- RSPAC attended "Bringing the Internet into Your Classroom," a statewide conference for West Virginia educators sponsored by Bell Atlantic. RSPAC conducted two presentations for elementary and secondary educators and staffed an exhibit about NASA, IITA, and RSPAC activities. Over thirty (30) boxes of NASA educational materials (lesson plans, classroom activities, posters, lithographs, etc.) were distributed.

- RSPAC collaborated with the West Virginia High Technology Consortium (WVHTC) by assisting in teacher training sessions offered through a Challenge grant. The goal is to establish a base of West Virginia teachers who will make use of existing educational resources provided by NASA, and in particular by the IITA projects. Three presentations, "NASA Online Resources for K-12 Educators," "NASA Resources for Educators," and "Graphical Design for the Web," were given on a number of different dates.

- Additional activities included:

  - instructing teachers in creating Web sites as part of the WVHTC teacher training Challenge grant program.

  - "Designing for the Web" at Fairmont State College, an instructional guide for students based on RSPAC's telecon courses for CATs.

  - a hands-on presentation for students from Rivesville Elementary, Rivesville, WV. These students were the first to use the NASA Learning Center kiosks. (See Section 4.4.)

  - presenting seminars about the Web to four classes at Fairmont Senior High School.

  - exhibiting and presenting at the West Virginia University Computing and Technology Fair.

  - distributing letters to over eighty (80) West Virginia schools about the Live from Mars television broadcast. Information on the Passport to Knowledge project and how to get additional teacher resource kits was enclosed.

  - a presentation on remote sensing at the Earth System Science Summer Academy hosted by the Network Resources and Training Site at Elizabeth City State University.

NASA LEARNING CENTER

— — RSPAC has created a NASA Learning Center at the NASA Software Independent Verification and Validation (IV&V) facility in Fairmont, WV. This center consists of several multimedia kiosks which showcase Internet technologies and educational products produced by NASA.

The NASA Learning Center provides a creative means of showing teachers how technology can be used in the classroom. It engages educators by featuring cutting-edge technology (e.g., the Internet, the World Wide Web, CU-SeeMe, and RealAudio), as well as by presenting more traditional resources (e.g., videos and CD-ROMs) in an interesting format.

The diversity of the educational projects within the IITA allows for many themes to be developed. Since not all of these themes can be presented at once, the Learning Center will provide displays that rotate through and highlight different themes. The current implementation is one in which stations portraying various themes and technologies are mixed and matched to provide an engaging and informative experience for even the casual passerby.

RSPAC's participation in the West Virginia-based "A Day in the Park" event was prominently mentioned in the *Ames Astrogram*. The article detailed the RSPAC-developed NASA Learning Center kiosk stations and addressed the Learning Technologies Project.

The Learning Center kiosks provide an impressive display of technology and NASA educational resources, and their usage will be monitored in the upcoming months. Version 1 of the multimedia displays has met with favorable response, including interest from the president of West Virginia University.

1996-1997 Accomplishments

- **NASA Learning Center Kiosks** — RSPAC successfully completed version 1 of the NASA Learning Center, which consists of seven kiosks showcasing IITA education projects and NASA education resources. The kiosks are housed in the NASA IV&V facility in Fairmont, WV. The initial configuration consists of one multimedia station, two Internet technology stations, two Web kiosk stations, one hands-on station, and one CD-ROM station. Local educators and students have access to the kiosks, which have become a permanent addition to the facility. The initial configurations of these stations are as follows:

  - The *multimedia station* will be used to give demonstrations of available Internet technologies. During off-peak sessions, video footage showcasing NASA education opportunities will be shown.

  - Both *Internet technology stations* will display CU-SeeMe, RealAudio, VRML, and Java capabilities.

  - Both *Web kiosk stations* will have a constant side frame with links to the IITA Web site, the NASA Education homepage, Spacelink, Quest, and the Observatorium. From these sites, educators will be able to get to any of a wide range of NASA education resources. In the current configuration, one station highlights interactive IITA projects and the other highlights NASA education resources. They also point to cool images and games using NASA imagery.

- The *CD-ROM station* will highlight educational CD-ROMs being developed in concert with NASA. The CD-ROMs that are currently showcased are "Exploring the Internet with NASA" (RSPAC), "Dryden Aeronautics" (part of the RSPAC CD), "NASA Publications" (part of the RSPAC CD), "High-Energy Astrophysics Learning Center" (Goddard Space Flight Center), and "Mars Virtual Exploration" (Ames Research Center).

- The *hands-on station* uses LEGOs to create a plane that flies in front of a fan. The LDAPS Web site is made available for detailed instructions on the use of LEGOs in the classroom.

- The multimedia kiosks were used to support the "A Day in the Park" event put on by RSPAC, the West Virginia High Technology Consortium (WVHTC), and NASA. Over 700 seventh-grade students participated in the event. Also participating were Carnegie Mellon University's Digital Library Initiative's "Ask Einstein" project, Tufts University's LDAPS project, and Independence High School in San Jose, CA, which continuously supported CU-SeeMe sessions during the event.

[redacted]ING THE INTERNET WITH NASA" CD-ROM *(cdrom.ivv.nasa.gov)*

— — — The "Exploring the Internet with NASA" CD-ROM introduces young students and first-time adult users to the Internet. Users discover what the Internet is and what it is used for, and gain hands-on experience in navigating the Net and the World Wide Web. The CD-ROM is a full-featured commercial quality product, and takes full advantage of the multimedia capabilities of Adobe's Director authoring tool. There are video productions using professional actors superimposed on computer-generated backgrounds and interactive elements to keep the user engaged throughout the presentation.

[redacted] Accomplishments

- RSPAC created an online distribution mechanism for the "Exploring the Internet with NASA" CD-ROM which can be seen at (*cdrom.ivv.nasa.gov*). This page contains an overview of the CD, and for those with ample hard disk space, links are provided for downloading a Mac or PC version (approximately 64 MB).

- The CD is also being distributed by NASA through its educator resource center network and directly by RSPAC. The CD-ROM sells for $2 per copy plus shipping costs. (This price reflects only the production and mailing costs of the CD and does not include any profit.) Four thousand six hundred (4,600) copies of "Exploring the Internet with NASA" were sold or distributed during the past year.

- WDTV, a CBS affiliate in Clarksburg, WV, featured the CD-ROM on an evening news broadcast. The report gave an overview of the CD-ROM and mentioned the RSPAC connection to it.

[redacted]EE IITA INFORMATION LINE

— — A toll-free number to support the IITA project was established at RSPAC in December 1996. The number is 1-888-K12-IITA (1-888-512-4482). This service is being used to provide information about IITA and its associated projects to teachers who do not have Web access.

1996-1997 Accomplishments

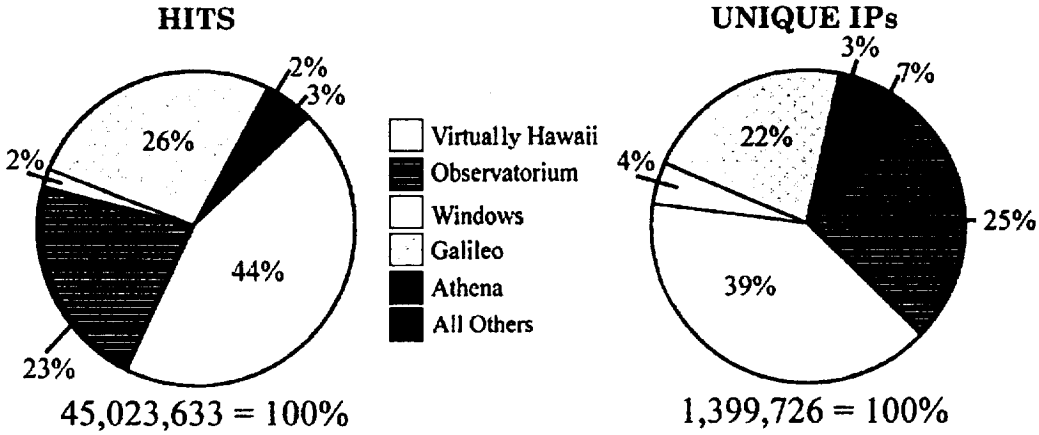
- Using the toll-free number, RSPAC supported IITA in the collection of requests for its NASA Educator Kits, which showcased the IITA projects and Internet technologies. Included in each kit was a copy of the RSPAC CD-ROM "Exploring the Internet with NASA." Approximately 530 names and addresses were collected via the 888 phone line and an additional 770 were gathered from a Web-based data collection form on the IITA Web site. RSPAC created and distributed a press release to publicize the NASA Educator Kits using the Observatorium mailing list.

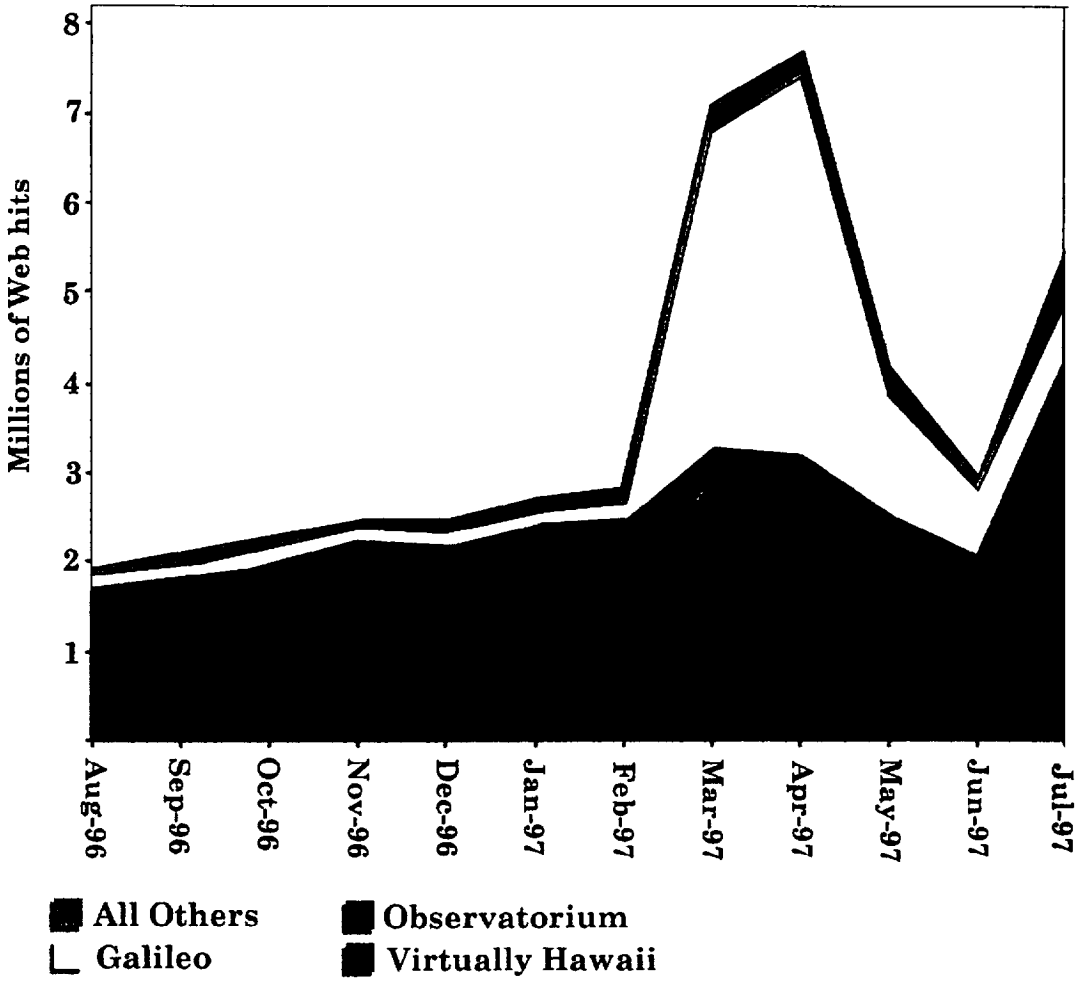
[redacted]RVER STATISTICS

— — RSPAC relies heavily on computer and Internet technology, and retains staff with expertise in many operating systems and computer platforms. One of its main functions is to house and maintain Internet servers for its own use and for use by many of the IITA CAT teams. Shown below are a number of tables and graphs depicting Internet access to RSPAC's computers and giving an indication of how many users RSPAC has directed to other IITA projects.

1996-1997 Accomplishments

SERVER	HITS	UNIQUE IPs
Virtually Hawaii	19,722,874	552,335
Galileo	11,690,365	389,583
Observatorium	10,395,669	352,580
Athena	919,859	62,283
Windows to the Universe	836,963	34,639
COAPS	461,216	24,633
IITA	294,964	24,108
Developers' Workshop	182,980	14,833
RSPAC Programmatic	85,117	10,382
SAIRE	58,408	2,349
Internet CD-ROM	3,368	1,328
Live from Antarctica	1,138	596
Miscellaneous	237,437	10,965





[redacted]NTERNSHIPS

— — — RSPAC is committed to being a "good neighbor" in the West Virginia community. To meet this goal RSPAC has established and is a participant in a number of internship programs with local universities, colleges, and high schools.

[redacted]TERN PROGRAM

— — — The Department of Defense instituted the Science and Engineering Apprentice Program (SEAP) for high school students in 1980. The NASA IV&V facility, which houses RSPAC, participates in the SEAP program and encourages projects within the building to host a SEAP student each summer. Participating scientists, engineers, and technicians work with high school students during the summer to help them gain a first-hand understanding of scientific and engineering methods while fostering interest in pursuing college-level training that could lead to careers in science and engineering.

1996-1997 Accomplishments

- RSPAC sponsored two SEAP students during the summer of 1996, Becky Wright and Brian Bennett. Becky Wright conducted a ground truth survey using remote sensing imagery and field work. Brian Bennett configured hardware and software to download weather facsimile images via short-wave radio. Becky received top honors from NASA for her SEAP internship project, "Ground Truth Analysis - What a Satellite Sees," which was chosen as the best project of the NASA SEAP program. She received a trip to the Ames Research Center to present her paper and meet with NASA officials. Becky was also featured on the front cover of NASA's *Ames Astrogram* newsletter (October 18, 1996) and on the front page of the Fairmont, WV, *Times-West Virginian* business section (October 6, 1996).

FAIRMONT STATE COLLEGE GRAPHICS INTERN PROGRAM

— — — RSPAC is collaborating with Fairmont State College, located in Fairmont, WV, to provide students with the means to complete a practicum. Each student who receives a degree in graphics technology must complete 130 hours of employment related to that field. This work experience must be completed in one semester, and the student receives both college credit and a grade for the experience.

1996-1997 Accomplishments

- RSPAC hosted four Fairmont State College practicum students during 1996-1997. The practicum students were assigned to RSPAC's graphics development team and were involved in the Observatorium, the *IITA Bulletin*, and other projects. The students were exposed to many state-of-the-art graphics tools and Web development techniques. All four successfully completed their RSPAC internships.

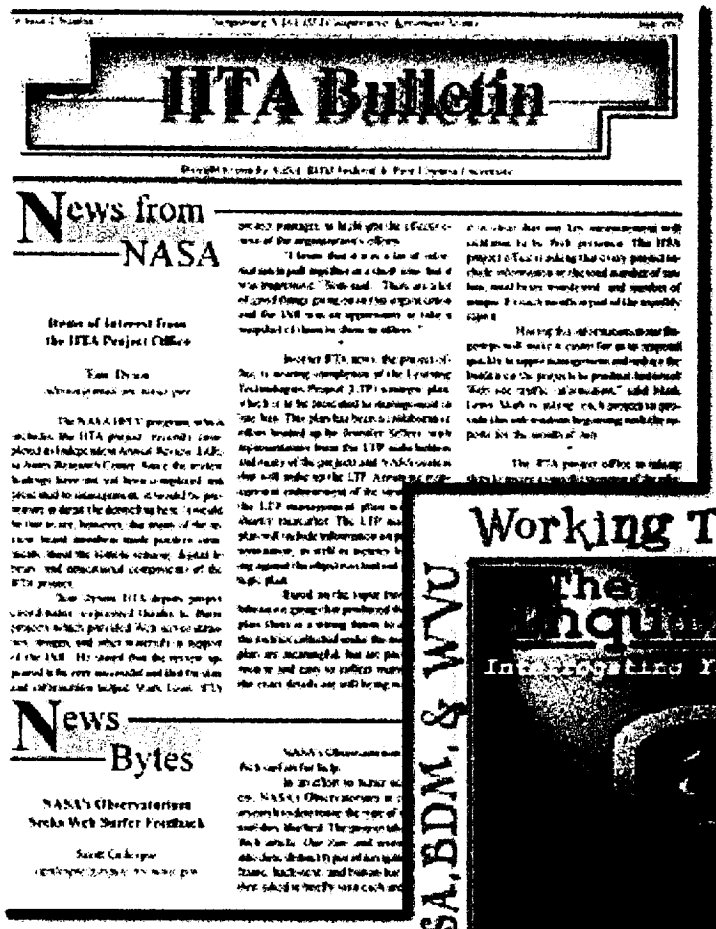
WEST VIRGINIA UNIVERSITY INTERN PROGRAM

— — — West Virginia University is a teaming partner with BDM International on the RSPAC project. During 1996-1997, WVU's contribution to RSPAC transitioned from a technical systems administration role to that of providing content for the Observatorium. This arrangement is benefiting both RSPAC and the students at WVU, who make up the majority of WVU's RSPAC presence.

1996-1997 Accomplishments

- RSPAC hosted six WVU undergraduate and graduate students in 1996-1997. Most of these interns were contributing authors to the Observatorium. In addition, one student was assigned to work on IITA support projects and another was part of the RSPAC system administration team.

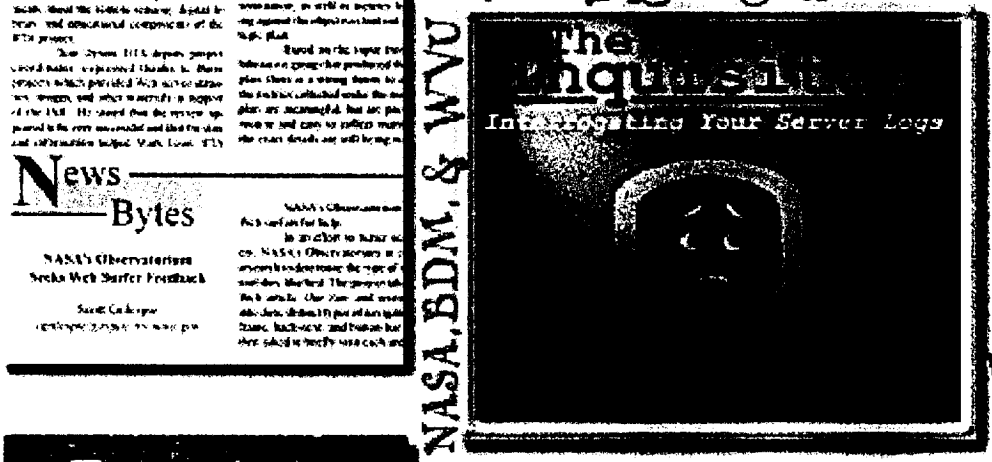
Collaboration


IITA Bulletin

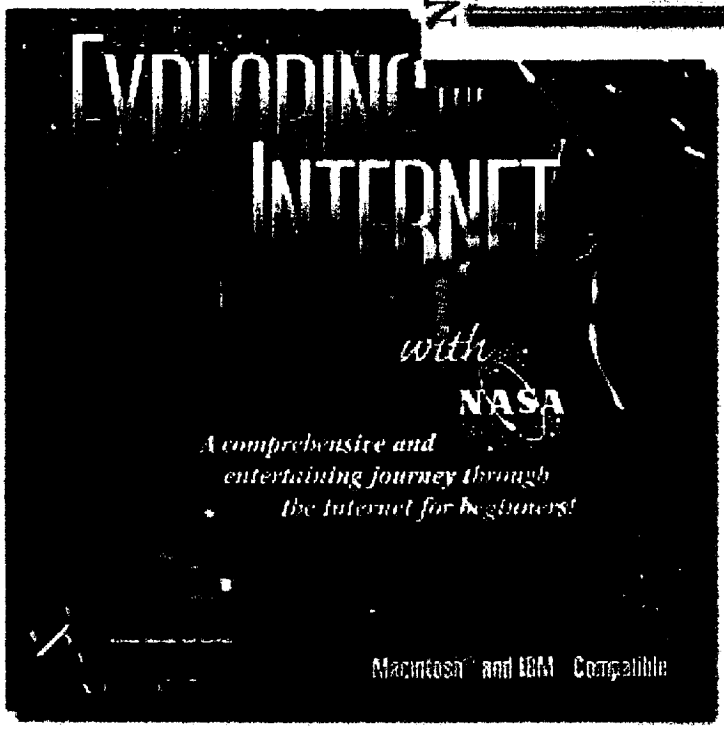
News from NASA

News Bytes

NASA's Observatorium Seeks Web Surfer Feedback


Working Together

NASA, BDM, & WVU



Los Angeles Times

Big Brother Was Watching by David Colker, *Times* Staff Writer

Someone was watching over me, from above, while I grew up in a small town in Pennsylvania during the 1960s. Indeed, someone was watching all of us.

I'm not talking about any deity. It was the United States government, and I have proof — 866,041 spy satellite photographs, taken all over the world from 1960-72 and now available for viewing on the World Wide Web.

The photos from the U.S. spy satellite programs — code-named Corona, Argon, and Lanyard — were declassified by executive order in 1995, seemingly with the support of the Central Intelligence Agency, which ran the programs.

This was no high-tech operation by today's standards. The satellite camera system used actual film stored in a capsule that would be ejected, if all went well. An airplane with a large hoop was to snare the capsule, slowed by a small parachute, before it hit the ocean. Not surprisingly, many of the capsules were lost at sea. Also, several of the approximately 130 satellites launched as part of the programs failed to reach orbit.

One former agency official disclosed at a symposium that Corona cost about $850 million, alone.

The best Web introduction to the photos is on a NASA site — http://observe.ivv.nasa.gov/nasa/earth/spy/spy_1.html — that demonstrates how Corona photos were used to identify a Soviet missile base and military airfield. In the spirit of the post-Cold War, the site also makes available a Soviet spy satellite photo of a large U.S. aviation complex.

Los Angeles Times

Science File: On the Internet

NASA's *Observatorium*, at http://observe.ivv.nasa.gov, features a new celestial observation each week and provides current headlines about space exploration. A reference section offers educational articles and tutorials. The Image Gallery contains many stunning pictures of the universe, solar system, moon, spacecraft, and more.

THE TORONTO STAR

STAR SURFIN'
NASA's Observatorium on the Web
Is a Great Place toStart

by K. K. Campbell, *The Toronto Star*

When I was a boy, there was no greater aspiration than to grow up to be an astronaut.

In Grade 5, I even wrote a "play" about Apollo 11. Yes, a play about a space launch. *The Toronto Star* reported on it, even ran a picture of my friend and me wearing these tin foil space helmets that would make Ed Wood Jr. proud.

(As the play was some four hours long, I would like to now formally apologize to those poor parents who so innocently wandered in to watch it.)

Something happened to "space exploration" between then and now. It went from excit-

ing to tedious. An episode of *The Simpsons* lampooned the U.S. space program, noting that space launches are unable to draw higher ratings than *Bowling for Dollars* (or my school play).

The Simpson family shrieks in terror and desperately lunges for the remote control when Tom Brokaw appears on the tube to deliver play-by-play commentary on a space launch which will conduct research on the "effect of weightlessness on tiny screws."

But I didn't love space for the suits and ships. For me, space itself is as awe inspiring as ever. It is a realm of science full of wonder and elicits the urge to explore.

And it's exactly that quality that makes space a natural for exploring through the World Wide Web.

What better place to start than the U.S. space agency's NASA's Observatorium (http://observe.ivv.nasa.gov). This public access site offers years of NASA exploration and discovery data, photos, movies, and sounds about familiar NASA-ish stuff — Earth and space photos, the Hubble Space Telescope, planets, comets, etc.

But because NASA's Observatorium is a product of the Remote Sensing Public Access Centre, it has some fascinating online exhibits dealing with "Earth photos." Satellite shots. Even spy photos of things like Russian missile installations.

And it has some really interesting, non-techy type features. For instance, you can read Spy, an online novel. It's written in the Ian Fleming style and uses lots of declassified Cold War reconnaissance spy photos. This is wonderfully creative stuff, leveraging information into a new medium.

"The Search for Ubar" exhibit examines how NASA discovered a lost city buried deep beneath Arabian sands. It's beautifully laid out and there's a version for those with Shockwave-enabled browsers.

The legend goes like this: Ubar, a rich and fabulous trading centre of ancient Arabia, rose out of the desert and then mysteriously vanished back into the sands. References to Ubar in the Koran, *The Arabian Nights*, and countless Bedouin tales told around desert campfires have captivated the imaginations of explorers and archeologists. But all searches were fruitless and the city remained lost.

Now, centuries after Ubar's disappearance, a combination of hard work, dedicated research, and remote sensing technology has perhaps unraveled this ancient mystery.

Probably the single most interesting area is that dedicated to determining the size of crowds through aerial photography. NASA details how satellite technology determined actual attendance and helped end debate surrounding just how many attended the "Million Man March" on Washington, D.C., in October 1995.

The National Park Service said 400,000 people attended; organizers labeled that a "gross underestimate." Could "remote sensing" solve the dispute? Sure did.

The Boston University team estimated the figure to be 878,587. (We really could have used some remote sensing during the Days of Action protests a couple of Saturdays ago in Toronto, when the crowd estimates ranged from 20,000 to 300,000.)

Say whatever else you want about NASA, but any Web site that can make the counting of objects in aerial photographs interesting has hit a home run.

Some of the best quality time I've spent online.

NASA'S OBSERVATORIUM HAS FASCINATING IMAGES AND ARTICLES

In 1969, NASA put a man on the Moon. In 1997, NASA's Pathfinder mission touched down on Mars.

Today, NASA's Observatorium Web site is a fixture in cyberspace, offering visitors a fascinating Internet window to the best of NASA's Earth and space knowledge.

NASA's Observatorium combines years of NASA exploration and discovery with the latest Web technology, giving visitors a site that's literally out of this world.

All your NASA favorites are here. Mars images and information. Earth and space photos. The space shuttle. The Hubble Space Telescope. Planets. Comets. Black holes. Eclipses...a body of knowledge as vast and varied as the universe itself.

From the continually updated "Observation of the Week" to in-depth articles on NASA projects, both acclaimed and inconspicuous, NASA's Observatorium showcases the agency that personifies American spirit and ingenuity.

Included today in NASA's Observatorium's galaxy:

- **SPACE SCIENCE.** What lies beyond our Big Blue Marble? Here's info on NASA's planetary and deep space exploration programs, astronomy, and the origins of life.
- **IMAGE GALLERY.** A picture is worth more than a thousand words when the images are as unique as these. Your favorite NASA photos are here.
- **PLANET EARTH.** It doesn't take a rocket scientist to tell you the Earth is changing and humans are influencing, and being influenced by, these changes. Here NASA turns inward as it studies the Earth, the most remarkable planet of all.
- **FUN & GAMES.** Who says science can't be fun? Play "Concentrate!," "Slider Puzzle," and many more online games.
- **SPACEFLIGHT.** "Houston, Tranquility Base here..." "...one small step..." "Shuttle is go for launch..." See how NASA programs for humans in space will increase our knowledge of nature's processes and enrich our lives here on Earth.
- **EDUCATION.** Our future astronauts are online today. Here, NASA provides ideas and material for teachers and students through its many programs and centers.
- **AERONAUTICS.** NASA is taking the technological lead in developing tomorrow's safer, more efficient aircraft.
- **SEARCH.** Looking for something specific? Try NASA's Observatorium search engine and discover scientific finds of your own.

NASA's Observatorium is a cooperative agreement among NASA, BDM International, and West Virginia University. It promotes NASA technology via the Internet.

YAHOO! Internet Life

Mystery of Million Man March Solved?

REMEMBER THE DEBATE OVER HOW MANY PEOPLE ATTENDED the Million Man March on Washington, D.C., called by the Nation of Islam's Louis Farrakhan? Well NASA has weighed in with its count, which you can find out about by visiting the Web.

When the rally happened in October 1995, the organizers proclaimed that more than a million people had attended. The National Park Service, however, just as confidently stated that only about 400,000 people were present, with a count reflecting its long-standing survey methods. Who was right?

Enter the NASA Observatorium. The folks at NASA know a bit about counting crowds as well, and they have enlisted the services of Dr. Farouk El-Baz, director of the Boston University (BU) Remote Sensing Lab and a specialist in the field of "remote sensing." This technique is used by foresters to count trees on aerial photographs, by agronomists to count hay bales and cows, and by planners to count houses and cars.

On the site, Dr. El-Baz demonstrates, with graphic support, just how he counted the attendees. Dr. El-Baz's team used two separate digital counting methods to develop their results — which are demonstrated on the site. The final count was 878,587 — that's with an estimated error margin of about 25 percent, meaning the number could have been over one million, or as little as 659,000.

Why a 25-percent margin of error? "The margin of error selected by Dr. El-Baz reflects several constraints he had to face in this study, including highly distorted images of rather

poor quality," said Joe Gardner, Ph.D., the Observatorium's curator. Gardner added that, "Consequently, for these and other similar reasons, it is my opinion that the 25-percent margin is justifiable."

Why do I think this won't put an end to the debate?

NASA's Playing Games

THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, OTHERWISE known as NASA, has created an area within its Observatorium Web site called Fun & Games, "in celebration of the vernal equinox." This has to be the only Web site with a .gov designation that has "fun" somewhere in the URL.

The site offers such gaming highlights as "Concentrate," in which players "match and remove Earth and space images to reveal a hidden picture." There's a Java-supported "Slider Puzzle," a version of those frustrating hand games in which you have to unscramble a bunch of tiles to form a picture. And, on "Where in the World?" you can try to identify parts of the earth as seen from space satellites.

According to Observatorium curator David H. Brown, "Our intention in developing these games is to help educate the public in a way that is entertaining as well as informative. Learning should be fun, and if we can attract people with games and then hook them with what I personally feel is the much more engaging information on the rest of the site, then I think that is a reasonable way to get NASA's products out to the public."

The Observatorium site is a cooperative effort between NASA's Information Infrastructure Technology and Applications program, the BDM International information technology company, and West Virginia University. According to Scott Gillespie, a spokesman for NASA, the idea behind the Web site is to promote NASA technology.

I have to admit, I'm not quite comfortable with "fun" government Web projects. What's next, a "fun" IRS tax site, complete with an online board game in which you end up broke? That ought to be good for a few laughs.

NASA Observatorium (courtesy of Project Cool: Sightings) For those of you still fascinated by discoveries on Mars (yeah, count us in), this site is a godsend. Full of data both terrestrial and unearthly, this exhibits much of the best of NASA's current work. We took the tsunami tour with no previous interest in the big waves and were pleasantly surprised by the charming explanations; you'll find other voyages of discovery here to be equally enlightening.

Astronomy *Magazine*

Observatorium in Cyberspace

In 1969, NASA put a man on the moon. In 1996, NASA takes you there and to other places it has visited or observed. NASA's Observatorium web site, located at http://observe.ivv.nasa.gov, offers an Internet window to the best in NASA Earth and space knowledge. Features include a continually updated "Observation of the Week," "Headlines," and in-depth features on both acclaimed and inconspicuous NASA projects. Of course the NASA favorites will be there — Earth and space photos, the Hubble Space Telescope, planets, comets, black holes, and eclipses. The Observatorium combines years of NASA exploration and discovery with the latest web technology, giving visitors a site that's literally out of this world.

You can contribute to this column compiled from *Roanoke Times* staff and wire reports and comment by sending us your e-mail or by calling 981-3393 or 981-3237 in the Roanoke Valley or 1-800-346-1234, x393.

Check out comet Hale-Bopp on NASA's Web site Comet Hale-Bopp, which was pictured on Wednesday's front page and can be explored in detail on the National Aeronautics and Space Administration's new Web site.

The site provides photographs of the comet, a map of its whereabouts in the sky at particular times, general information about it and links to other sites on the Web where even more information can be found.

You can even chart Hale-Bopp's movements through the constellations.

Also on the site are photos of a recent total solar eclipse over China.

Furthermore, you can search such general areas as space science, a photo gallery, planet Earth, fun and games, spaceflight, education and aeronautics.

THE DOMINION
Post

WVU-NASA Web Site Gets a 'Cool' Rating
by Cynthia McCloud, *The Dominion Post*

Want to see pictures of Washington, DC, or the Strait of Gibraltar — taken from space?

Photos of these and other world geographical features visible from space are on-line at the Observatorium Web site, a joint project of WVU, BDM International and NASA's Information Infrastructure Technology and Applications Program.

Project Cool honored the Observatorium with a Daily Sighting recognition this month.

Rick VandenBossche, assistant director of educational technology services at WVU's academic computing department, worked on the project.

"I think the site is in its second or third evolution since its creation in 1994 and it has matured quite a bit," he said. "We were one of the first groups in the area to use Java in a Web site." Java is a programming language that allows a Web site designer to add visual enhancements.

"The main goal," he said, "is to bring NASA information to the public and assist other NASA projects in making their material and research available to the public in a format that's equal across the board. There's been a very strong effort in the government to verify information and put out truthful info that people can rely on."

The Observatorium crew has been involved in many special projects, including outreach to local schools and demonstrations at teachers' conferences.

The site features profiles on NASA's aeronautics and deep space exploration programs and includes information for aspiring astronauts to achieve their goals, Pathfinder links, and images and games.

Project Cool, based in Palo Alto, CA, was founded in 1995. Its Sighting award recognizes a handful of sites that can serve as inspiration for other Web creators.

Central Michigan Life

Web Site Offers a Lot for Science and History Buffs
by Jeremy H. Dickman, *Life* Staff Writer

For science and history buffs, the NASA Observatorium website offers space photographs, interesting facts and all the space information imaginable.

The website was created by the National Aeronautics and Space Administration, along with West Virginia University and BDM International.

"It started as just a public service with NASA to bring space and earth knowledge to the internet and classroom," said Scott Gillespie, director of public relations for NASA's Observatorium.

Launched just over one year ago, the site includes information on such things as the space shuttle, Hubble Space Telescope, past NASA trips to the moon, and the Million Man March, Gillespie said.

Photographs of these items also are available on the site, along with pictures of the Earth, space, the planets, the sun, comets, stars and black holes.

Pictures of the Million Man March, organized by Louis Farrakhan in the fall of 1995, show shots of the large crowd and include a detailed description of how the attendance of the march was counted.

"It's a very neat site. We're very proud of it," Gillespie said.

Included in the image gallery area, a section called "Around the World" allows visitors to go around the world in 80 scenes. Going from Alexandria (Egypt) to New Zealand and in between, the color photographs show the world from space satellites.

Despite being fairly new, the NASA site receives around one million views per month, Gillespie said. Many of these are from classroom use.

Some online space games also included on the website are for enjoyment. Among the games is "Concentrate!," where players pair up and remove pictures of the Earth and space to uncover a hidden photograph. While playing "Where in the World?" players try to name places as they are shown from space satellites.

A new feature on the website is called "Spy." This novel-like story gives information on the United States CORONA spy program and includes actual spy pictures from the Cold War, along with photos of Soviet missile sites, military airfields and launch pads.

Space postcards also are available from the website.

Upon entering the NASA Observatorium website, visitors simply choose from the main page listings, which include informational and educational listings, games, an image gallery and other space-related topics.

The NASA Observatorium website is part of NASA's "Bringing the Internet to the Classroom" project, Gillespie said.

The site is located at http://observe.ivv.nasa.gov.

EDUCATIONAL HORIZONS

Have You Observed Today?

Have you observed today? If not, check out the "Observatorium," an attractive, informative Web site - http://observe.ivv.nasa.gov - that promotes NASA's remote sensing technology in an enjoyable and enlightening format ideal for classroom activities.

In profiling remote sensing technology - or studying without touching - the "Observatorium" combines contemporary and historical examples with exciting NASA photos and colorful graphics. The Web site is continually updated, easily navigable, and allows users to see how NASA technology helps us develop a better understanding of our world and beyond.

See satellite imagery and learn how the "Observatorium" discovered the lost city of Ubar and helped combat flooding along the Mississippi River. In addition, it also offers outer space photos received via the Hubble Space Telescope (three-dimensional images of the doomed star Eta Carinae, for instance), recently declassified spy satellite shots, and many other displays that tell the story of remote sensing.

The standard features of the "Observatorium's" home page include:

- **Observation of the Week.** An earth or space science image and a brief explanation of its significance.
- **Exhibits.** A gallery of fun, interesting stories, each addressing an aspect of remote sensing.
- **Headlines.** A timely disclosure of NASA and remote sensing-related activities.
- **Education.** A showcase of NASA and education-related resources.
- **Reference.** Explanations and examples of remote sensing terms.
- **Data at Work.** Examples of the practical, everyday uses of remote sensing technology.
- **Guestbook.** Where visitors may register and provide comments on the site.

The "Observatorium" is part of NASA's Remote Sensing Public Access Center (RSPAC), which is a cooperative agreement between NASA and BDM Federal. RSPAC supports NASA's Information Infrastructure Technology and Applications (IITA) program. IITA funds such diverse project areas as weather, aquatics, aeronautics, environmental science, space, agriculture, and emergency and crisis management. The IITA program also supports several projects that encourage careers in the sciences, and reaches historically underserved groups such as minority and physically disabled students.